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SOURCE Zheleznodorozhnyy Transport.NEW SOVIET RAIL STANDARDS

Zheleznodorozhnyy Transport, No 6, 1947

By government decision GOST, (All-Union State Standard) 3542-47 for rails for wide-gauge railroads replaces OST (All-Union Standard) 118-122. The new standard becomes effective 1 April 1947. The adopted standard prescribes the grade of rails for wide-gauge railroads of the following types: R-50, R-43 (Type I-a improved), and R-38 (Type II-a). The specifications of the R-38 rail remain unchanged. Basic specifications of the rails are as follows:

	<u>R-50</u>	<u>R-43</u>	<u>R-38</u>
Gross section area (sq cm)	64.50	55.70	49.06
Moment of inertia relative to horizontal axis (cm ⁴)	2,016.00	1,472.00	1,222.54
Moment of resistance in vertical plane (cm ³)			
along upper grain (po verkhnemu voloknu)	248.35	206.20	181.95
along lower grain (po nizhnemu voloknu)	284.69	216.50	180.29
Moment of inertia relative to axis of symmetry (cm ⁴)	416.00	257.00	209.28
Moment of resistance relative to axis of symmetry (cm ³)	63.03	45.00	36.72
Weight per running meter of rail (kg)	50.504	43.613	38.416

The new standard establishes the normal length of the R-50, R-43, and R-38 rails at 12.5 meters and 25 meters. On the length of the rail a tolerance of plus or minus 6 millimeters is allowed; tolerances on the width are minus 2 millimeters and plus 1.5 millimeters; on height, plus 0.8 millimeters and minus 0.5 millimeters; on width of head, plus or minus 0.5 millimeters.

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Dimensions of the R-50 and R-43 rails (in millimeters) are as follows:

	<u>R-50</u>	<u>R-43</u>
Base	132	114
Height	152	140
Head	70	70
Web	29	27
Depth of head	42	42
Fishing	83	71
Depth of base	27	27
Head angle	1:4	1:3
Base angle	1:4	1:3
Bottom of rail to center line web radius	68.5	62.5

Production of R-50 rails has been begun by industry.

Zheleznodorozhnyy Transport, No 6, 1948

At the end of May 1948, a meeting took place in the track division of the All-Union Scientific Research Institute of Railroad Transport to discuss suggestions for strengthening the Type R-43 rail, which has replaced the old Type I-a rail profile.

In 1938 there was developed a new type of rail which weighed 43.6 kilograms per running meter, representing an improvement of the profile of the I-a rail. Rolling of this rail, which was called Type I-u (uluchshennyy - improved), was begun in 1940. The service of these rails in track (more than 3,000 kilometers) showed their merit immediately. After the war this profile was included among the standard rails and now is being rolled in mass quantity.

However, recurring cases of cracks and fractures in the rail, although fewer in number and occurring under difficult operating conditions, have forced engineers and technicians to search for methods to strengthen the rail further. In particular, many rail specialists proposed that the weight and profile of the rail be changed. At the May 1948 meeting it was declared that the R-43 rail cannot be considered satisfactory even for those conditions for which it was designed, i.e., lines with a freight density of up to 15 million gross ton-kilometers per year, as the experience of the South Ural and Tomsk railroad systems has shown.

M. A. Chernyshev, chief engineer of the Main Track Administration of the Ministry of Transportation, stated in his report to the meeting that the question of changing the weight of the rail must be approached with caution, since expenditures for rail metal are an exceedingly important component of the metal balance sheet of the Ministry of Transportation.

In regard to the R-43 rail, it must be remembered that at present it is the lightest rail being rolled in mass quantity, he said. It is designed for an axle load of not more than 20 tons, and a freight density of 15 million gross ton-kilometers or less, he went on. The lines and sections where cases of fracture of the R-43 rail are prevalent are designed basically for Type R-50 rails. The length of these lines is less than 20 percent of the developed length of the USSR network. Type R-43 rails will be laid on the rest of the network, and there is no reason for wasting 3.2 tons of metal per kilometer in laying R-45 rails (as suggested at the meeting) on these lines, he continued.

Chernyshev stated further that it is necessary to strengthen the R-43 rail within the limits of its weight, and to improve the quality of the metal at the same time.

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Chernyshev's considerations received general support at the meeting, and a unanimous decision was adopted regarding the necessity of introducing radical developments for improving the R-43 rail by modifying its profile, but not by increasing its weight.

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